ecom®

Creative technology made by rbr

Operating Instructions

ecom® • CN •

Index	Page
Important hints	3
1. Instrument design	4
2. Accessories	5
3. Getting started	6
4. Input or selection of a combustion plant	7
5. Gas analysis	
5.1. Measurement preparation	9
5.2. Gas analysis	9
5.3. CO measurement (safety check)	11
5.4. Draught / Pressure measurement	12
5.5. Soot.. Oil trace	13
5.6. Record and print measurement	13
6. Adjustments	14
7. Control	16
8. Data processing	
8.1. Menu data processing	17
8.2. Data processing via IRDA	18
8.3. Data processing via Bluetooth (option)	19
8. Maintenance tips	21
10. Technical data	25
11. FAQ	26

Important hints

The ecom-CN meets the requirements of DIN EN 50379 part of 2.

The ecom-CN may not be used for continuous emission control!

Following minimum times must be kept, in order to receive correct measured values:
-1 min. to calibrate the sensors at fresh air
-2 min. for stable measured values

The following substances impair the working of the instrument:
-Cleaning agents
-Degreasers
-Wax polishes
-Adhesives
-Formaldehyde

Adjustments at burners and boilers should be made only by specialists, who are familiar with those installations!

1. **Charge the accumulator regularly (Charge not used instrument min. once a month)!**
2. **Never store the instrument with unloaded accumulator!**

1. Instrument design

RS232 interface

Infrared sending diode (for IR printer)

Pressure connection (option)

Sucking temperature connection

Charging socket

In the input mode the keys are used for numerical input

Function keys (function shown on display)

OK key (choice confirmation)

Display lighting ON/OFF

Record values

Cursor monitoring (up/down/scroll)

ESC key (quit/ escape menu)

Contraste adjustment

Instrument ON/OFF

Print key (to print menu)

Gas connection

Condensate monitoring connection

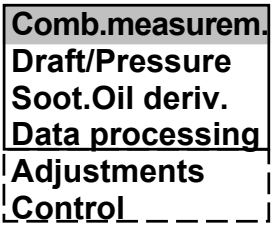
Draft connection

Gas temperature connection

2. Accessories

Carrying bag with magnet Item no.: 52000 	**Transport case Deluxe** Item no.: 60089
Transport case LC Item no.: 60124 	**Soot pump kit** Item no.: 50538
External printer Item no.: 33000011 	**T-Room sensor stick** Item no.: 51446
Data cable CN Item no.: 52179 *without illustration*	**Adaptor cable USB / RS 232** Item no.: 51521 *without illustration*
Filtering case (solid combustibles) Item no.: 55810 	**CO-multi-hole probe** Item no.: 54724
O2-multi-hole probe Item no.: 30000503 	**T-Room probe 300 mm** Item no.: 20008950

3. Getting started



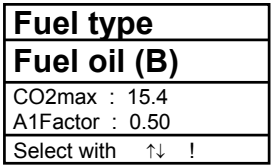
Once the instrument is switched on (press key **<I/0>**) the main menu is displayed. 6 sub-menus (non visible menus can be called up while scrolling with the arrow keys) are listed with the following respective function:

- Gas analysis : Perform gas analysis
- Draft/Pressure : Perform draft or pressure measurement
- Soot...Oil trace : Input of soot measurement results
- Data processing : Classify measurements/Load or send data
- Adjustments : Modify instrument adjustments
- Control : Check instrument operation state

To start a measurement select the sub-menu **"Comb.measurem."** using the arrow keys and confirm with **<OK>**. The instrument starts a 1-minute calibration phase and the fuel types selection is displayed. The following fuel types are selectable:

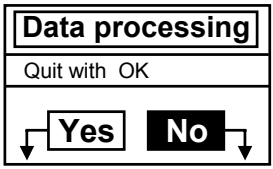
Fuel types according to 1st BImSchV

Fuel oil (B)
Natural gas (B)
City gas (B)
Coke oven gas (B)
Liquid gas (B)

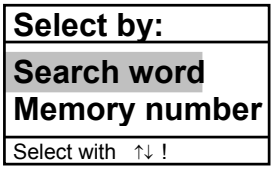


Use the arrow keys to select the correct fuel type and confirm with **<OK>**.

The instrument will then enquire if a data bank function is requested. If the measurement values should be attributed to a specific plant, so press **<F1>** (**<F4>** = no: measurement will be made without classification).



4. Input or select a plant

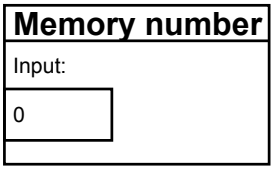


In order to call up a plant which data are already stored in the instrument or to create a new file, the following alternatives are possible:

Memory number: The allocation of a number is a possibility to record a new plant in the instrument.

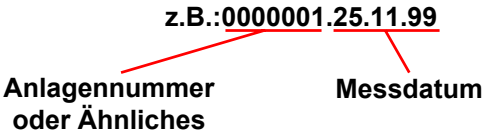
Select **„ Memory number“** and confirm with **<OK>**.
Input a random memory number (0 -4000):

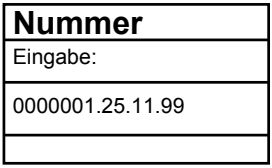
Example: "0"
for storage number 0



After input, press **<OK>** to call up the storage number. Pressing **<F3>** will allocate the next free (considered from memory number 0) memory number. Press **<F4>** to input a plant identification.

Hint: As the input is only numerical (max. 16 digits) it is recommended to make a date related input in order to -later on- easily find the data record using the search function (search for date):





Once the input is finished, activate the memory number with **<OK>** and access the gas analysis menu (press twice **<ESC>** to return to main menu, select **„Gas analysis“** and confirm with **<OK>**).

Search word: In case the plant identification is known, so a plant already recorded can be found out using a search machine.

Select **"Search word"** and confirm with **<OK>**. Input 4 related digits of the plant identification:

Search word
Input:
25.11

Input example: "25.11" for plant identification 0000001.25.11.99

After input, press **<OK>** to start the search. All correspondences with this number get filtered. Use the arrow keys to scroll thru the selected numbers (F1 for selection start, F2 for selection end).

Once the desired data block has been found, press **<OK>** to activate and view the previous measurement performed at this plant (select **„Look at“** and confirm with **<OK>**).

F1:First	F3:Empty
F2:Last	F4:Edit
0000001.25.11.99	
Memory number	8 M

Measurement data existing

All measured and calculated values are accessible on screens, scrollable one after the other with the cursor keys.

Date	Time
25.11.99	10:35:56
0000001.25.11.99	
Memory number	8

O2	3.2	%
CO2	13.1	%
CO	12	ppm
Lambda	1.18	
T.Gas	184	°C
T.Air	20	°C
Losses	7.5	%
Eta	92.5	%

CO-measur.	
O2	17.5 %
CO 0.0%	738 ppm
CO	123 ppm
Lambda	7.00
Gas analysis: keys ↑↓ !	

Soot.Oil deriv.	
Draft	-0.08 hPa
T.Boilerl	65 °C
1.Soot meas.	0.5
2. Soot meas.	0.3
3. Soot meas.	0.7
Oil trace	No

Press twice **<ESC>** and then **„ Comb.measurem.“ <OK>** to start with the next measurement.

5. Gas analysis

5.1. Measurement preparation

Always use a filtering system as per our recommendation for combustion plants firing solid combustibles!

Prepare the instrument for operation in that you perform all connections (T-Room sensor and T-Gas, GAS and DRA of the 3-chamber hose). Make sure that:

- the condensate pad has enough absorption capability (condensate trap with monitoring)
- the condensate receptacle contains no humidity (condensate trap without monitoring)
- the fine dust filter and the safety filter are not soiled darker than number 3 on the soot scale

5.2. Gas analysis

1. **Always position the probe in the exhaust pipe once the calibration phase is over!**
2. **Never operate the instrument in the transport case (recommended for transport)!**

To obtain accurate measurement values, re-calibrate the instrument after each measurement (at the latest after one hour)!

Once the 1-minute calibration phase is over, the instrument enters the measurement mode. The values are viewable on 4 screen pages (3 x gas analysis; 1 x CO measurement; use the cursor keys to scroll the pages):

O2	**4.0**	%
CO2	**12.5**	%
T.Air	**20**	°C
T.Gas	**212**	°C

O2	**4.0**	%
CO2	**12.5**	%
CO	**30**	ppm
Lambda	**1.23**	

O2	4.0	%
CO2	12.5	%
CO	30	ppm
Lambda	1.23	
T.Gas	166	°C
T.Air	20	°C
Losses	7.0	%
Eta	93.0	%

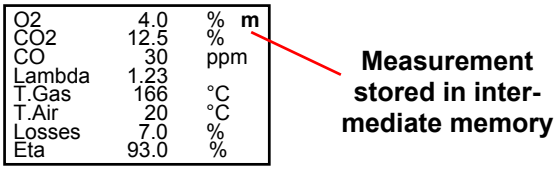
The position of the measured and calculated values (gas analysis) on the display pages is free selectable.
Proceed as follows to modify the succession:

- press **<F1>** to activate the first line on the display
- select the measured or calculated value with the cursor keys
- press **<F1>** to activate the next line and so on until the last line

CO2, efficiency, losses, excess air and dew point are calculated values. They can only be determined if realistic values are available for the basis values like O_2 and temperatures. It must ascertained that:

O2 < 20,5 % and
T. Gas - T. Air > + 5 °C

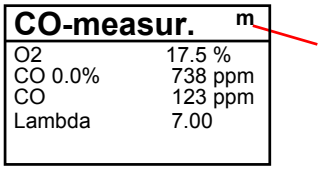
The dew point can only be determined with accuracy if in the menu **"Adjustments"** the current barometric air pressure is inputed. This value cannot be determined by the instrument.
If the gas temperature falls below the dew point (between 25 and 65 °C), Eta will be calculated with condensation. In the display (C) appears behind Eta.
Correct measurement values are displayed after a short delay of ca. 60 to 90 seconds which are necessary for the gas transport and the built-up of a stable electrochemical reaction of the sensors. For recording, printouts and evaluation wait until the values get stable. If the gas values still fluctuate more than 2 ppm, so the reason can be unstable draught conditions in the exhaust pipe.
If the measurement values are stable and the results recordable, so press **<record>** (disk symbol) to transfer the values in an intermediate memory (caution: store gas analysis, CO and O2 measurements separately).



They will be stored there for a later printout and, if need be, a final data record storage (you can view the values in the intermediate memory by pressing **<F4>** - during the inquiry the gas pump switches off).
The CO sensor is protected against exceedings by the internal programme. If the limit value of 4000 ppm is exceeded, a second pump switches on and flows the sensor with fresh air. The sensor with can be switched into the measuring mode by pressing the **<F2>** key (the sensor can also be switched off by pressing the **<F2>** key).

5.3. CO measurement (safety check)

The check of gas-fired plants for operation safety reasons is performed with the CO measurement. The CO content in the exhaust pipe is measured after the flow fuse and converted on an undiluted value (residual oxygen value in exhaust gas = 0 %).
As the gas behaviour after the flow fuse is no more homogeneous because of the flow in of secundary air and the core stream measurement could consequently be erratic, the gas analysis is performed over the total diameter of the pipe. A multi-hole probe serves as sampling probe hereto (optional accessory).
The calculated value indicated on the line CO 0.0% corresponds to the measured CO content supposing that the oxygen content would amount 0% in the same gas volume. It is consequently the undiluted CO content in exhaust gas. Once the value is stable, press **<record>** to store the value in the intermediate memory.



Measurement stored in intermediate memory

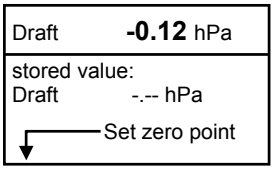
5.4. Draft / Pressure measurement

Besides the draught measurement the **ecom-CN** offers the possibility of a differential pressure measurement (option). The instrument must hereto be fitted with a second connection (pressure) on the front.

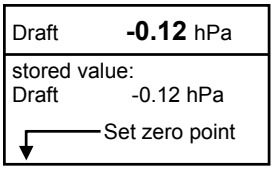
Draft measurement:

The gas analysis mode already provides with a trend indication for the draft conditions in the exhaust channel. The chimney draft value is not recorded simultaneously to the other gas values (while pressing **<record>**) because the sensitive differential pressure sensor easily tends to drift. For an exact measurement, it is consequently recommended to re-calibrate this sensor just before analysing the value. Select the sub-menu **"Draft/Pressure"** to start the measurement.

The display shows the current value as well as the mention to reset the sensor´s zero point. Hereto release the draught hose for a few seconds and press **<OK>**. The sensor is re-calibrated.



Re-plug the draft hose. The display shows the exact mesured value which you can store and add to all available results stored in the intermediate memory while pressing **<record>**. The recorded value is shown on the display.

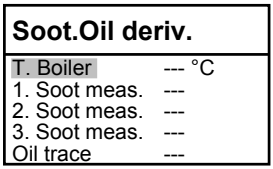


Press **<ESC>** to quit the draft measurement mode.

5.5. Soot...Oil trace

In the sub-menu **"Soot.Oil deriv."** the measurement values for boiler temperature, soot dot number and oil trace can be inputed.
Select the corresponding line on the display and press **<OK>** to activate the input. The input for boiler temperature and soot dots 1-9 can occur one after the other using the instrument keyboard. Press **<OK>** to take over the value in the mesurement data record. The result of the oil trace determination can be documented as follows:

- Place cursor on line **"Oil trace"**
- Use **<OK>** to adjust result (**"No", "Yes" or "- - - "**)

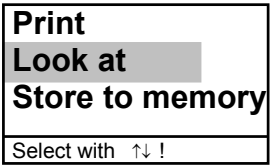


Once all necessary inputs have been made, press **<ESC>** to quit the menu. The measurement is complete.

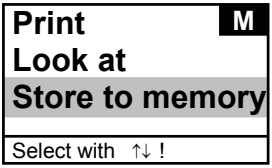
5.6. Record and print measurement

After the gas analysis, please transfer the recorded data (intermediate memory) into the internal instrument memory otherwise the values will get lost by instrument switch-off!

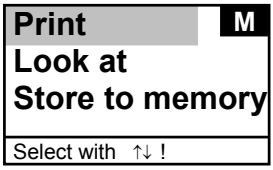
Press **<Print>** (printer symbol) to access the printing menu. If need be, the recorded values can be checked again (**„Look at“**, **<OK>** and scroll with the cursor keys).



If all data are correct, press **„Record -> M“** and **<OK>** to transfer in the internal memory. A successful transfer is characterized by a **"M"** on the upper right part of the display.



Then a data printout can be started (**„Print“** and **<OK>**). The **ecom-CN** is preset for a printout via the infrared printer type **HP 82240B**.
For the case the new IR printer type **ecom-P** is in use, a corresponding selection must be made under **„Adjustments“ / „Internal“**.

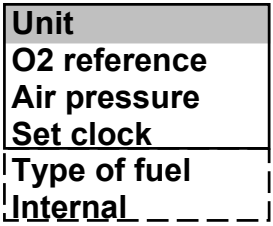


Please care for a frictionless (direct sight) connection between the sending diode on the front of the instrument and the receiving diode on the printer. The maximal distance between both units should not exceed ca. 40 cm otherwise a troublefree transfer is no more ascertained in any case.

Press **<ESC>** after printout termination to return to the **"Main menu"**.

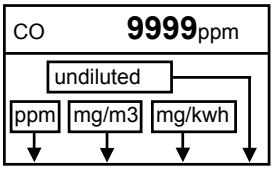
6. Adjustement

Additionally to the functions described above, the **ecom-CN** allows several adjustments. From the main menu select the sub-menu **"Adjustment"** and confirm with **<OK>**. A selection of adjustable parameters is displayed which can be adjusted according to the application. Place the cursor on the desired line and press **<OK>** to call up or modify the adjustment.



Unit (Adjustment via **<F1>** - **<F3>**):
- Calculation of gas concentrations in:

  - ppm = volume concentration (parts per million)
  - mg/m3 = mass concentration per volume unit
  - mg/kWh = mass concentration per performance unit



Undiluted (Adjustment via **<F4>**):
- Conversion of gas concentration on inputed reference oxygen:
  - Formula for conversion:

$$E_{ref} = E_{meas} * \frac{21 - O_{2ref}}{21 - O_{2meas}}$$

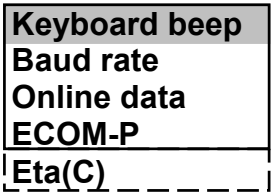
O2 reference (press **<OK>** to access input mode):
- Input of reference O2ref

Air pressure (press von **<OK>** to access input mode):
- Input of barometrical air pressure for the dew point calculation

Set clock (press **<OK>** to access input mode):
- Correction of internal clock

Type of fuel (press **<OK>** to access selection mode):
- Modification of adjusted fuel type

Internal (press **<OK>** to open menu):
- Further instrument adjustments:



Keyboard beep (**<F1>** for Yes / **<F4>** for No):
- Acoustical signal by pressure on key

Baud rate (adjustment via **cursor keys**):
- Adjustment of transfer speed by data transfer via RS 232 (1200 -19200 Baud)

Online data (adjustment via **cursor keys**):
- Adjustment if online data should be sent via RS232 or IR

ECOM-P (Adjustment **<F1>** for Yes / **<F4>** for No):
- Adjusted of selected printer: **„YES“** = ecom-P
„NO“ = HP 82240B

Eta(C) (**<F1>** for YES / **<F4>** for NO):
- Efficiency calculation with or without condensation gain

7. Control

The electrochemical sensors used for the gas analysis are submitted to a wearing process and consequently do age. Along the operation period, they alter their output values depending on the gas concentration, flow duration and soiling degree of the measured gases. The programme controls the sensors and corrects drifts. If drifts and the correlated measurement errors increase, an error message is displayed. In this case the corresponding sensor must be changed by an authorised service centre.
The control menu informs about the current status values for the sensors and on 2 further pages (scroll display page via cursor key) about:

- the battery voltage (charging state)
- the phone number of the next service centre
- the serial number
- the software version
- the operation hours
- the date of the last service
- the number of CO switch offs
- the number of errors occurred

O2	1034 mV
CO	-10 mV
Batt	6.42 Volt
Tel.No.	02371/945-5
Ins.No.	CN-0009 V1.1
Further info with ↑↓ !	

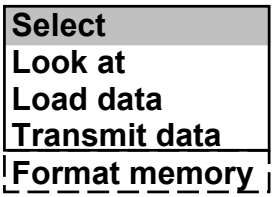
Oper. hours	7.39
Service date	23.06.04
CO switch offs	0
Error counter	00
Tel.No.	02371/945-5
Ins.No.	CN-0009 V1.1
Further info with ↑↓ !	

8. Data processing

8.1. Menu data processing

The menu **„Data processing“** allows the selection of the following functions:

Select:
This sub-menu enables to search for or create a plant file for the allocation of measurement values (see chapter 4.).



Look at:
The recorded values of the selected plant can be viewed (see chapter 4.).

Load data:
Possibility of data import e.g. from Chimney Sweepers Management Programmes (check the transfer options of your software and if need be, adjust them at the instrument / see chapter 6.).
Proceed as follows:

1. Connect instrument and PC with a current RS232 cable.
2. Select **“Load data“** and confim with **<OK>**.
3. Answer following question with **Yes** (**<F1>**).
4. Decide if the date recorded in the instrument can be deleted (**<F1>** for **Yes** / **<F4>** for **No**).
5. Start the data transfer at the PC.

Transmit data:
The date record completed with values can be transfered to the PC programme using this function (procedure identical to **„Load data“**).

Format memory:
This function is normally only needed by the initial adjustment of the instrument by the manufacturer (preparation of internal memory to data receipt). **Caution: All recorded values will get lost !**

8.2. Data processing via IRDA

The following possibilities are available for data processing via IRDA:

1.Using the measurement data management programme MiniDV
(gratis software from rbr Messtechnik GmbH).
Hereto the following adjustments must be made at the **ecom-CN**:
Adjustments-Internal-Baud rate->IRDA
and
Adjustments-Internal-Online data->none

2.Using the online data record programme DASNT
(gratis software from rbr Messtechnik GmbH).
Hereto the following adjustments must be made at the **ecom-CN**:
Adjustments-Internal-Baud rate->IRDA
and
Adjustments-Internal-Online data->DAS

3.Using the PDA solution
The infrared interface of the PDA can be used to transfer measurement data stored temporarily from the **ecom-CN** into the PDA.
rbr Messtechnik GmbH offers a programme called CNIrDA which can be started as process e.g. from a management programme for chimney sweepers. By calling-up, this programme performs the communication between PDA and instrument and provides with an ANSI text file named ECOM.TXT as a result. This file covers the measurement results transferred from the instrument to the PDA. To transfer data blocks from the **ecom-CN** to the PDA, the following adjustments must be made at the instrument:
Adjustments-Internal-Baud rate-IRDA
and
Adjustments-Internal-Online data DS->COM

The communication will not function without these adjustments.
Once the programme is called up, it will be tried via infrared signal to establish a communication to the **ecom-CN**. Hereto both the interfaces of the instrument and of the PDA must be directed in front of each other. Press the button „Back“ to stop the search. The programmes is then finished and no file ECOM.TXT is written.

Once the **ecom-CN** is identified, the message „Connection build-up ...“ and then „Start transfer at ecom CN“ are displayed.
Press the „Print“ key to start transferring the data stored in the **ecom CN**. Once the transfer is completed, the measurement values are displayed in a table on the PDA.
The user can then decide if he wants to keep the values. By pressing the key „Cancel“ the measurement values get deleted and the programme turns back in receiving mode.

Pressing the key „Accept“ generates the data to be written in the file ECOM.TXT and the programme is finished. The transfer between PDA and instrument is secured via a check sum. In case of transfer problems, the error message „Transfer error“ is displayed.

8.3. Data processing via Bluetooth (option)

The following possibilities of data processing via Bluetooth are available:

1. Using the measurement data management programme MiniDV
(gratis software from rbr Messtechnik GmbH).
Hereto the following adjustments must be made at the **ecom-CN**:
Adjustments-Internal-Baud rate->Bluetooth
and
Adjustments-Internal-Online data->none

2. Using the online data record programme DASNT
(gratis software from rbr Messtechnik GmbH).
Hereto the following adjustments must be made at the **ecom-CN**:
Adjustments-Internal-Baud rate->Bluetooth
and
Adjustments-Internal-Online data->DAS

3. Using the PDA solution

The Bluetooth interface (option) of the PDA can be used to transfer current measurement data from the **ecom-CN** into the PDA.
The communication via a virtual Bluetooth COM port is used as transfer principle. rbr-Computertechnik GmbH offers a programme called CNRemote which can be started e.g. from a management programme for chimney sweepers as process.
By calling-up, this programme performs the communication between PDA and instrument and provides with an ANSI text file named E-COM.TXT as a result. This file covers the measurement results transferred from the instrument to the PDA.

The programme CNRemote runs on PDA with Bluetooth interface and the operating programme Microsoft Windows Mobile 2003 or higher. The programme needs the Microsoft Compact Net Framework version 2.0 or higher. The programme assumes an **ecom-CN** with firmware version 1.9 or higher as well as the Bluetooth option. If a corresponding firmware update is needed, contact your authorised ecom service centre.

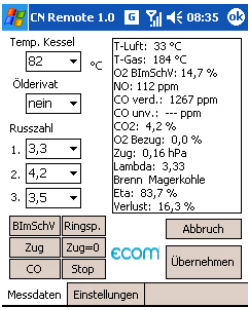
The following adjusments must be made at the **ecom-CN** in order to transfer data records to the PDA:
Adjustments-Internal-Baud rate-Bluetooth
and
Adjustments-Internal-Online data-Remote

The communication will not function without these adjustments. Once the programme is started with /Programmes/ecom/ecom.exe the user must select in the rider „Adjustments“ the serial Bluetooth port made available by the PDA operation system. The installation of the serial Bluetooth port is described in the PDA documentation.
If no Bluetooth-able PDA or no Bluetooth-able **ecom CN** is available, the user can work with demonstration measurement data while activating the function „Simulate instrument“.

The desired function can be selected in the rider „Measurement data“. The following functions are available for the remote operation of the **ecom-CN**:

Gas analysis
Starts gas analysis procedure until the key „Stop“ is pressed
O2 check
Starts O2 check until the key „Stop“ is pressed
Draught
Starts draught measurement until the key „Stop“ is pressed
Draught=0
Zeroes draught sensor
Stop
Quits active measurement
Quit
Closes the programme without data export in the file ECOM.TXT
Accept
Closes the programme with data export in the file ECOM.TXT

During the measurement procedure, the current values are displayed in a table on the PDA.
If the button „Accept“ is pressed, the data get written in the file ECOM.TXT and the programme gets closed. The transfer between PDA and instrument is secured by a check sum. By transfer errors, the error message „Transfer error“ is displayed.

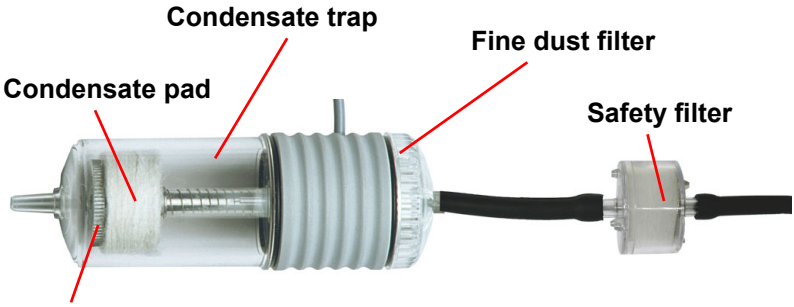


9. Maintenance tips

To secure the accuracy of your measuring instrument we recommend the annual check by an authorized ecom partner. In the case of strong demand (e.g. permanent several hours of measurement per day, rough conditions etc.) shorter intervals between checks should be selected - please contact your ecom partner. All ecom partners are listed under www.rbr.de. Do not use other sensors or feelers than those we selected and keep in mind that service jobs made by unauthorised centres will result in a complete warranty loss.

The following advices will be of help for the daily check and maintenance of single parts and assemblies:

Change fine dust filter (condensate trap profi version):
Screw off the cover. Release the filter and check the soiling state of the filter. Change it once it has a grey colour in the gas flow area (ca. number 3 on soot comparison scale). The safety filter should also be replaced when the soiling degree corresponds to number 3 of said comparison scale.



Condensate trap with monitoring (Profi version)

Change condensate pad (condensate trap profi version):
The condensate pad absorbs the humidity out of the sampled gas.
It streches with increasing humidity volume and activates a contact which switches off the pump (error message on display: „Empty water trap!“) once the humidity content is exceeding. Screw off the condensate trap. Release the knurled nut and place a new condensate pad. Re-screw the condensate trap.

Change fine dust filter (condensate trap basis version):
Release the upper cap. Release the fine dust filter and check its state. It should be replaced once the soiling degree in the gas flow area shows a grey colour (ca. number 3 on soot comparison scale). The safety filter should also be changed when the soiling degree corresponds to number 3 of said comparison scale.

Condensate trap without monitoring (Basis version)

Make sure that condensate never enters the instrument (otherwise sensors will get defective)!

Empty condensate trap (condensate trap basis version):
The condensate collects the humidity of the sampled gas. Check regularly how much liquid has been gathered. Empty the trap in time and avoid humidity to enter the instrument. Release the lower cap to empty the trap. Pour out the condensate. Reassembly the trap.

Sensors:
The sensors get calibrated with the reference gas fresh air by each switch-on procedure. The state of the sensors is permanently controlled by the instrument. New sensors age along the operation period because of the wearing of the reagents (oxygen sensor) and due to soiling respectively exceeding concentrations (CO sensor).
The output values of the sensors are (menu **"Control"**):

O2	ca. 1500 mV
CO	0 mV (+/- 50)

If an error message is displayed during calibration and cannot be eliminated despite several calibration phases, so the instrument must be checked by a qualified and authorised service centre. The oxygen sensor must show a value >300 mV, otherwise it must be changed by an authorised service centre.
The CO sensor is protected against exceedings by the internal programme. If the limit value of 4000 ppm is exceeded, a second pump switches on and flows the sensor with fresh air. The sensor with can be switched again into the measuring mode by pressing the **<F2>** key.

Power supply:
The accus should be recharged once the instrument instructs to do so (acoustical warning and message on display). The charging state can be checked on the display looking at the voltage indication (menu "**Control**"). The accu warning is activated when the value is lower than 5,6 V.
By 5,4 V no accu operation is possible anymore. The instrument must be operated via charger.

Probe and hose:
Depending on the frequency of use, probe and hose should should be regularly cleaned in order to release particle deposits and to prevent early wearing due to corrosion.

10. Technical data

Parameters	Range	Principle
O2	0 ... 21 vol-%	Electrochemistry
CO	0 ... 4000 ppm	Elektrochemistry
NO (Option)	0 ... 5000 ppm	Elektrochemistry
CO2	0 ... CO2max	Calculation
T-G	0 ... 500 °C	NiCr/Ni
T-R	0 ... 99 °C	Semiconductor
Differential pressure	0 ... +/- 20 hPa	DMS bridge
Efficiency	0 ... 120 %	Calculation
Losses	0 ... 99,9 %	Calculation
Excess air	1 ... ∞	Calculation
CO undiluted (ref.O2; adjustable)		Calculation
Dew point		Calculation

Power supply	Mains power unit 230 V / 50 Hz~; Accu 5 x 1,2 V / 2 Ah
Indication	Graphics display; backlit
Dimensions (WxHxD)	115 mm x 250 mm x 77 mm
Weight	ca. 1,5 kg complete with sampling system

Subject to technical changes
V2.7 / 05.2011

rbr Messtechnik GmbH
Am Großen Teich 2
D-58640 Iserlohn
Telefon: 02371 - 945-5
Telefax: 02371 - 40305
Internet: http://www.rbr.de
eMail: info@rbr.de

11. FAQ

Where do I find important instrument information?	In the menu „Control“ all important instrument informations are shown (e.g. accu voltage, sensor values, unit number, next service date, operation hours etc.). With the arrow keys stands you can switch to the second page.
How long is the life span of the sensors?	The life span depends on the operating hours and the instrument equipment. The life span of the toxic sensors (CO, NO, SO2, NO2) is affected by high gas concentrations and a not sufficient purging. The life span for these sensors amounts to on the average between 4 and 6 years. The life span of the O2 sensor is independent of the operating hours and amounts to approx. 2 years.
Which sensors can I exchange?	Please contact the next authorised service centre for changing sensors.
The instrument shows the error message „O2 sensor 0 mV“!	The sensor must be renewed.
The instrument shows the message „Check required“!	This message appears automatically every 12 months or after 250 operating hours. Note: This is a recommendation to let check the instrument. The instrument is however still ready for use.
The instrument shows the error message „T-Gas“ oder „T-Air“!	Possible reasons could be: - Cable is broken (at the plug) - T-Air sensor is broken - Thermocouple is broken - Cable is defective
The instrument shows wrong or inaccurately CO2 values!	Possible reasons could be: - O2 is defective (CO2 values are calculated from the O2 values) - Pump is not working correctly - Leakage in the gas way - condensate trap / gas cooler is clogged

My instrument cannot be switched on!	- Please check the mains cable - Please check the fuse - Please check mains connection (Plug socket switched on?) - Please load the accumulator min. 8 hours (Accumulator could be over-discharged)
My instrument does not print!	Please check whether the printer paper is correctly inserted. The thermal printer writes only on the thermally sensitive side. Please use always the correct paper for the printer, you will prevent defects at the printer. Please make sure that the printer is clean (no chads in the drive).
Can I change the printout?	Please contact the next authorised service centre, if you want to change the printout.

Hint: If you have several instruments of the same type, you can locate an error by exchanging the accessories (probe, hose, temperature sensor etc.).

If further questions or problems should arise, please contact the next authorised service centre.